What is claimed is:

1. A cam mechanism comprising:

a cam ring; and

a linearly movable frame movable by the cam ring along an optical axis of an optical system without rotating, by engagement of a plurality of cam grooves located on said cam ring with a plurality of complementing cam followers located on said linearly movable frame when said cam ring is rotated, said linearly movable frame supporting at least one optical element of said optical system,

wherein said plurality of cam grooves are located at different positions at least in said optical axis direction and which trace substantially a same reference cam diagram;

wherein all cam grooves of said plurality of cam grooves are partial cam grooves each having at least one end opening at at least one of opposite ends of said cam ring, so as not to include an entire portion of said reference cam diagram;

wherein said plurality of complementing cam followers are located at different positions at least in said optical axis direction and are respectively engageable in said plurality of cam grooves; and

wherein at least one of said complementing cam

followers remains engaged in a corresponding said cam groove while at least one of the other of said complementing cam followers comes out of said end opening and is disengaged therefrom, when said linearly movable frame moves to at least one of opposite limits for movement thereof in said optical axis direction.

2. The cam mechanism according to claim 1, wherein said plurality of cam grooves comprises a front cam groove having at least one front end opening at a front end of said cam ring so as not to include a front part of said entire portion of said reference cam diagram, and a rear cam groove having at least one rear end opening at a rear end of said cam ring so as not to include a rear partof said entire portion of said reference cam diagram;

wherein said complementing cam followers comprise a front cam follower and a rear cam follower which are engaged in said front cam groove and said rear cam groove, respectively;

wherein said front cam follower comes out of said front opening to be disengaged from said front cam groove while said rear cam follower remains engaged in said rear cam groove when said linearly movable frame moves to a front limit for movement thereof in said optical axis direction; and

wherein said rear cam follower comes out of said rear

opening to be disengaged from said rear cam groove while said front cam follower remains engaged in said front cam groove when said linearly movable frame moves to a rear limit for movement thereof in said optical axis direction.

3. The cam mechanism according to claim 1, wherein:

the mechanism is part of a zoom lens system movable between a retracted position and a zoom range position; and

during a zooming operation within the zoom range position, the at least one of said complementing cam followers remains engaged in corresponding said partial cam groove while the at least one of the other of said complementing cam followers comes out of said end opening and is disengaged therefrom, when said linearly movable ring moves to at least one of opposite limits for movement thereof in said optical axis direction.

4. The cam mechanism according to claim 2, wherein said front cam groove and said rear cam groove are formed as a continuous groove and a discontinuous cam groove, respectively.

5. The cam mechanism according to claim 1, further comprising:

a plurality of cam groove groups, each said cam groove group comprising said plurality of cam grooves located at different positions in said optical axis

direction, said plurality of cam groove groups located at different positions in a circumferential direction of said cam ring; and

a plurality of cam follower groups, each said cam follower group comprising said complementing cam followers provided at different positions in said optical axis direction, said plurality of cam follower groups located at different positions in a circumferential direction of said linearly movable frame.

6. The cam mechanism according to claim 1, wherein said optical system comprises a plurality of movable lens groups movable in said optical axis direction while changing a distance therebetween by rotation of said cam ring, said linearly movable frame holding at least one of said plurality of movable lens groups.

7. The cam mechanism according to claim 1, wherein said optical system comprises a photographing lens system.

8. A cam mechanism comprising:

a cam ring; and

a linearly movable frame movable by the cam ring along an optical axis of an optical system without rotating, by engagement of a pair of cam grooves located on said cam ring with a pair of cam followers located on said linearly movable frame when said cam ring is rotated,

said linearly movable frame supporting at least one optical element of said optical system,

wherein said pair of cam grooves are located at different positions in at least said optical axis direction and which trace substantially a same reference cam diagram, respectively;

wherein at least one cam groove of said pair of cam grooves is a discontinuous cam groove having at least two end openings at at least one of opposite ends of said cam ring so as not to include a part of an entire portion of said reference cam diagram;

wherein said pair of complementing cam followers are located at different positions in at least said optical axis direction and engageable in said pair of cam grooves, respectively; and

wherein one cam follower of said pair of said complementing cam followers comes out of said end opening and is disengaged from one of said pair of cam grooves while the other of said complementing cam followers remains engaged in the other of said cam grooves, when said linearly movable frame moves to at least one of opposite limits for movement thereof in said optical axis direction.